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The Effect of Ethnicity and Maternal Birthplace on Small-for-Gestational-Age Deliveries to HIV-Infected Women

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ABSTRACT

Objective. *To examine the relative role of ethnicity and maternal birthplace on small-for-gestational-age (SGA) deliveries of a cohort of mothers in New York who were infected with human immunodeficiency virus.*

Methods. *Medicaid claims and linked vital statistics records were examined for 2,525 singleton deliveries to HIV-infected women from 1993 through 1996. We estimated adjusted odds ratios (AORs) and 95% confidence intervals (CIs) of SGA delivery associated with ethnicity (i.e., white, white-Latina, black, and black-Latina) and maternal birthplace (i.e., native US/Puerto Rican vs. foreign born) in a series of multivariate regression models to which we sequentially added demographic, health services, and lifestyle factors (i.e., alcohol, tobacco, and illicit drug use).*

Results. *Of the deliveries, 10% were SGA. The odds of SGA infants for black and white women did not differ by maternal birthplace. Foreign-born white-Latinas and black-Latinas had lower unadjusted odds of a SGA delivery than their US-born counterparts (OR 0.29, CI 0.14, 0.61 and OR 0.22, CI 0.07, 0.71, respectively). After adjustment for maternal lifestyle characteristics, the odds of SGA delivery were 0.50 (CI 0.23, 1.09) for white-Latina mothers and 0.60 (CI 0.17, 2.08) for black-Latina mothers.*

Conclusions. *SGA outcomes did not differ by maternal birthplace for black and white women. Differences in lifestyle factors appear to contribute to lower odds of SGA delivery for foreign-born versus US-born white- and black-Latina HIV-infected women.*

KEYWORDS *African American, Hispanic American, HIV Infection, Medicaid, Small for Gestational Age, Substance Abuse–Related Disorders.*

INTRODUCTION

The size of the immigrant population in the United States has changed dramatically over the last three decades. The number of foreign-born residents has doubled,[1]

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from 4.8% of the population in 1970 to 9.7% in 1997. A vigorous debate has arisen concerning differences in birth outcomes of native- versus foreign-born women of the same ethnic background.[2–19] In a national study of deliveries in 1985–1987, Singh and Yu[2] found that foreign-born black, Cuban, Mexican, and Chinese women had substantially lower adjusted odds of low birth weight infants than their US-born counterparts after adjustment for diverse sociodemographic covariates. David and Collins[3] compared 1980–1995 Illinois birth certificate records for black mothers born in the United States and Africa and found significant differences in both low and very low birth weight after controlling for maternal risk factors. Using birth records from New York City, Fang et al.[6] reported that foreign-born black women were less likely to have a low birth weight delivery than US-born black women. Conversely, a study of 1992 California vital statistics data by Fuentes-Afflick et al.[7] concluded that maternal birthplace had little effect on the odds of moderately and very low birth weight deliveries of non-Latina white, black, and Asian mothers after adjustment for gestational age and socioeconomic factors. US-born Latinas, however, were significantly more likely to experience these adverse outcomes than their foreign-born counterparts.

We hypothesized that the observed effect of maternal birthplace might be due to differences in the use of prenatal care services or in lifestyle behaviors. US-born mothers may be less likely to obtain adequate prenatal care even when it is covered by insurance, perhaps due to personal and/or peer beliefs about medical care. Use of alcohol, tobacco, and illicit drugs may also differ substantially between US- and foreign-born women and consequently affect birth outcomes. To explore these possibilities, we examined the impact of maternal birthplace on small-for-gestational-age (SGA) deliveries among Medicaid-enrolled, women in New York State who were infected with human immunodeficiency virus (HIV). These women often have poor prenatal care and a high prevalence of licit and illicit substance use in pregnancy. These factors appear to contribute to an increased risk of poor birth outcomes.[20] We chose SGA delivery as our outcome as it is strongly associated with infant morbidity and mortality.[21] In our analysis, we estimated a series of multivariate models to explore which of these hypothesized factors might explain these reported differences in birth outcomes by maternal birthplace.

METHODS

Data Sources

Our study patient data were obtained from New York State Medicaid claims and eligibility files for women with a live-born delivery between January 1993 and October 1996 who met a case-finding screen for HIV infection. The case-finding algorithm used to identify HIV-infected mothers was determined to be 93% sensitive and 97% specific in a validation study of 116 HIV-infected and uninfected mothers at Bellevue Medical Center. The case-finding algorithm required (1) one inpatient or two outpatient diagnoses of HIV seropositivity or infection, (2) one outpatient diagnosis of HIV seropositivity or infection with one HIV care rate code, (3) an AIDS-defining diagnosis, or (4) receipt of antiretroviral therapy.

Study Population

The database offered information on maternal clinical status and service utilization for 3,037 deliveries. Vital statistics records were matched for 2,855 of these deliver-

ies (94%). In addition to each infant's birth weight and gestational age, birth records included information on the mother's ethnicity, birthplace, and sociodemographic attributes; and tobacco, alcohol, and illicit drug use during pregnancy. Women were excluded from this analysis for the following reasons: twin deliveries (n = 90) due to an increased risk of adverse birth outcomes; mothers for whom ethnic information was unavailable (n = 16) since this was key analytic data; and Asian or Native American mothers (n = 31) because of inadequate sample size for subgroup analysis. Because of the analytic problems associated with multiple outcomes for the same woman, one delivery was randomly selected for women with multiple singleton deliveries in the study period, eliminating 188 deliveries. Finally, 5 mothers born in Puerto Rico who did not identify themselves as Latina were dropped because of uncertainty regarding their ethnicity. The final study population consisted of 2,525 mothers.

Study Variables

Small for Gestational Age Delivery The primary study outcome of SGA delivery was defined as a birth weight below the 10th percentile for gestational age. Gestational age at delivery was based on the physician's estimate or, when unavailable (in 3% of deliveries), on the mother's estimate of her last menstrual period. The same approach to determine SGA delivery was used for all study women regardless of ethnicity, as in our earlier studies.[20]

Ethnicity and Birthplace Birth certificates were compiled from interviews with parents during the mother's birth hospitalization and include indicators for the mother's ethnicity and Latina origin. We separated black and white mothers into Latinas and non-Latinas, yielding four ethnic categories. We employed the term *ethnicity* because racial differences are often as much cultural as biological. Each ethnic group was subdivided further into US- and foreign-born subgroups depending on the mother's reported place of birth. Women born in Puerto Rico were classified as native because their characteristics more closely resembled native- than foreign-born women (Tables 1 and 2) and because of the close familial ties between many Latina New Yorkers and Puerto Ricans. Most of Puerto Rican women designated themselves as white-Latina (n = 169), and only a few designated themselves as black-Latina (n = 13). We do not report characteristics of the latter group separately due to small sample size. We do not have information on the place of birth of the parents of study women, so for example, we cannot distinguish mainland US-born women of Puerto Rican extraction from other US-born Latinas.

Maternal Weight Gain During Pregnancy From vital statistics, we examined maternal weight gain by quartile (<19, 19–26, 27–36, and ≥37 pounds) and with a category for unknown.

Maternal HIV Disease Stage Using Medicaid data, we searched for coded clinical diagnoses found previously to be strongly predictive of maternal-child HIV transmission.[22] Three clinical groups were defined: (1) severe—with acquired immunodeficiency syndrome (AIDS)–defining condition(s) such as *Pneumocystis carinii* pneumonia before or less than a year after delivery; (2) moderate—pneumonia or anemia in pregnancy; and (3) low—no severe or moderate complications.

TABLE 1. Distribution (%) of demographic and clinical attributes by ethnicity and maternal birthplace*

		White		Black		White Latina			Black Latina	
	N = 2,525	US born (n = 346)	Foreign born (n = 67)	US born (n = 1,071)	Foreign born (n = 56)	US born (n = 405)	Puerto Rican (n = 169)	Foreign born (n = 225)	US born (n = 35)	Foreign born (n = 151)
Small for gestational age	243	5.2	7.5	12.0	8.9	10.4	13.6	3.6†	14.3	5.3
Maternal age at delivery, years										
<20	233	9.0	4.5	9.1	17.9	12.8	10.1	5.8	5.7	5.3
20–24	602	34.7	28.4	21.7	21.4	22.2	20.1	19.6	17.1	29.8
25–29	760	23.4	26.9	30.0	32.1	34.1	26.0	36.0	37.1	30.5
30–34	616	22.2	26.9	24.6	23.2	23.5	27.2	26.7	20.0	24.5
≥35	314	10.7	13.4	14.8	5.4	7.4	16.6	12.0	20.0	9.9
High school education										
Graduate	1,178	48.8	55.2	48.6	57.1	35.8	35.5	54.2†	31.4	54.3‡
Missing	133	4.0	6.0	5.5	5.4	5.9	3.6	5.3	0.0	7.3
Married	392	24.3	47.8†	9.3	19.6§	10.9	9.5	31.1†	8.6	21.2
New York City resident	2,112	49.1	76.1†	84.8	100.0‡	96.5	89.9	92.0	97.1	94.7
Year of delivery										
1993	525	15.3	4.5	21.2	12.5‡	23.5	23.1	26.7	25.7	21.2
1994	649	17.3	17.9	27.3	12.5	33.1	25.4	27.1	20.0	21.8
1995	668	28.3	34.3	24.6	37.5	25.7	29.6	24.4	28.6	28.5
1996	683	39.0	43.3	26.9	37.5	17.8	21.9	21.8	25.7	28.5

Previous live births										
0	682	27.2	31.3	23.2	46.4†	28.4	21.3	39.1†	31.4	27.8
1–2	1,053	46.0	40.3	38.4	30.4	44.4	47.3	43.1	34.3	46.4
≥3	790	26.9	28.4	38.4	23.2	27.2	31.4	17.8	34.3	25.8
Interpregnancy gap <1 year	38	2.0	1.5	2.0	0.0	0.7	2.4	0.0	0.0	1.3
Weight gain in pregnancy, pounds										
<19	410	15.9	4.5	18.4	12.5	15.6	16.0	10.2‡	22.9	17.9
19–26	423	16.5	19.4	16.6	16.1	15.1	17.2	14.7	20.0	23.8
27–36	393	20.5	26.9	14.5	16.1	11.8	17.8	14.7	11.4	16.6
≥37	400	22.8	16.4	14.4	16.1	16.3	15.4	8.4	34.3	15.9
Missing	899	24.3	32.8	36.1	39.3	41.2	33.7	52.0	11.4	25.8
HIV severity‖										
Low	1,641	67.9	70.2	59.5	71.4	68.6	66.3	76.9§	48.6	67.6§
Medium	501	21.7	13.4	20.3	17.9	19.0	21.9	14.2	42.9	19.2
High	383	10.4	16.4	20.3	10.7	12.4	11.8	8.9	8.6	12.3
Chronic comorbidity (e.g., asthma)	1,014	37.0	25.4	43.7	28.6§	46.7	47.9	24.4†	51.4	27.8‡

*Percentages are proportions of each ethnic-nativity group with the specified attribute. Chi-square significance tests are for comparisons between US- and foreign-born within ethnic categories after grouping Puerto Ricans with natives.

†$P < .001$.

‡$P < .01$.

§$P < .05$.

‖Low = asymptomatic; medium = anemia and/or pneumonia; high = AIDS-defining diagnosis.

TABLE 2. Distribution (%) of health care utilization and lifestyle behaviors by ethnicity and birthplace*

		White		Black		White Latina			Black Latina	
	N = 2,525	US born (n = 346)	Foreign born (n = 67)	US born (n = 1,071)	Foreign born (n = 56)	US born (n = 405)	Puerto Rican (n = 169)	Foreign born (n = 225)	US born (n = 35)	Foreign born (n = 151)
Medicaid eligible throughout pregnancy	1,501	60.4	41.8†	63.5	28.6‡	69.1	66.9	41.3‡	77.1	36.4‡
Usual source of medical care	1,257	60.1	73.1	44.8	58.9	46.4	44.4	49.3	40.0	65.6‡
HIV-focused services	1,043	42.3	34.3	39.4	46.4	45.8	53.0	32.1‡	60.0	43.0
ART§ in pregnancy										
None	1,715	69.4	85.1‖	67.0	73.2	64.7	51.5	84.4†	57.1	66.2
<1 month	285	7.2	3.0	12.6	7.1	12.1	18.9	5.8	17.1	12.6
1 month or more	525	23.4	11.9	20.4	19.6	23.2	29.6	9.8	25.7	21.2
APNCU¶ Index										
Inadequate	873	29.1	32.8	43.1	28.6	30.1	24.2	24.6‖	34.3	33.8
Intermediate	163	7.6	9.0	6.0	5.4	8.3	2.4	3.6	14.3	9.3
Adequate	300	13.7	14.9	10.9	7.1	12.5	15.8	12.0	8.6	11.3
Adequate plus	1,166	49.7	43.3	40.0	58.9	49.1	57.6	59.8	42.9	45.7
Smoking in pregnancy	516	31.8	1.5‡	25.1	3.6‡	19.8	21.3	4.0‡	17.1	2.0‡
Alcohol in pregnancy	256	10.4	1.5‖	15.8	3.6‖	6.2	7.7	0.9‡	5.7	4.0
Illicit drug category										
Methadone treatment	201	8.1	1.5†	5.5	0.0‡	16.8	17.8	0.9‡	34.3	0.7‡
Medically supervised, drug-free treatment	99	2.9	0.0	7.3	1.8	1.0	2.4	0.4	0.0	0.7
Drug use during pregnancy	494	12.7	3.0	29.8	5.4	17.0	16.0	4.4	14.3	9.9
Drug use outside pregnancy	189	5.2	3.0	10.5	3.6	7.9	6.5	0.9	2.9	6.0
No drug use	1,542	71.1	92.5	47.0	89.3	57.3	57.4	93.3	48.6	82.8

*Percentages are proportions of each ethnic-nativity group with the specified attribute. Chi-square significance tests are for comparisons between US- and foreign-born within ethnic categories after grouping Puerto Ricans with natives.

†$P < .01$.

‡$P < .001$.

§Antiretroviral therapy.

‖$P < .05$.

¶Adequacy of Prenatal Care Utilization.

Chronic Medical Comorbidity An indicator was created for other medical conditions, including asthma, diabetes, or hypertension, as indicated by diagnoses on claims.

Kotelchuck's Adequacy of Prenatal Care Utilization Index To evaluate the timing and number of prenatal care visits, we determined the adequacy of prenatal care using Kotelchuck's Adequacy of Prenatal Care Utilization (APNCU) Index.[23] To create this measure, we examined the number and timing of encounters with obstetrics/gynecology, primary care, or HIV-specific providers from Medicaid claims and followed a previously published methodology that was predictive of birth outcomes in HIV-infected women.[24]

Usual Source of Medical Care During Pregnancy The usual source of medical care during pregnancy was defined as a provider who was visited at least twice and for the majority of the patient's visits during pregnancy.

Enhanced HIV-Focused Services In the late 1980s, the New York State Department of Health established designated centers of HIV excellence[25] and in 1993 added special provisions for HIV-focused ambulatory care services.[26] We created an indicator for care from a provider under a contract to deliver HIV-focused services such as case management, accessibility, and provider HIV expertise in exchange for favorable Medicaid fee differentials.

Antiretroviral Therapy We examined pharmacy claims for antiretroviral therapy during pregnancy and created a three-category variable (none, 1–30, or more than 30 days supply).

Maternal Smoking and Alcohol Use Maternal lifestyle variables during pregnancy included smoking and alcohol use data from vital statistics.

Illicit Drug Use and Treatment Maternal lifestyle factors also included use of illicit drugs. We identified drug abuse or dependence using a previously evaluated approach that searches claims for methadone maintenance treatment; medically supervised, drug free treatment; or diagnoses of illicit drug use.[27] These data were combined with self-reported illicit drug use from vital statistics records. Women were hierarchically classified into five drug use categories: (1) methadone treatment during pregnancy; (2) medically supervised, drug-free treatment; (3) illicit drug use during pregnancy; (4) any drug use or treatment outside (but not during) pregnancy; and (5) no identified drug use during the study period. If more than one of these designations was applicable, they were assigned to the first applicable category in the above order.

Other Demographic Variables Mother's age at delivery was categorized by 5-year age groups for analysis. Education level was divided into the categories of high school graduate, less than high school graduate, or unknown. Marital status, residence in New York City, and continuous Medicaid eligibility throughout pregnancy were analyzed as dichotomous variables. Parity was coded as 0, 1–2, or 3 or more prior live births. Because the interpregnancy interval has been shown to be associated with birth weight,[28] we created categories for intervals of less than 12 months

and 12 months or more. To account for possible secular trends, we adjusted for the year of delivery.

Analytic Methods

We initially compared patient demographic, clinical, health care, and lifestyle variables across the ethnicity-birthplace groups using χ^2 tests, then estimated multivariate models in two phases. First, we built a model of explanatory variables that were related to SGA delivery. We initially used a stepwise backward selection procedure with a generous inclusion criterion ($P < .2$) to identify background demographic and clinical attributes associated with SGA delivery. Second, health care utilization variables were added to the first model using a similar inclusion criterion. Last, maternal lifestyle behaviors during pregnancy were added. Although smoking history did not meet our inclusion criterion, this factor was forced into the model because it is known to affect birth outcomes. We also looked for interactions among the independent variables. Two interactions were significant ($P < .05$): (1) weight gain and HIV disease stage and (2) New York City residence and HIV-focused services.

Subsequently, we estimated an unadjusted model that included only the ethnicity-birthplace variables. We then added these ethnicity-birthplace variables to each of the series of multivariate models described above to explore the effect of each set of explanatory variables on the relationship of ethnicity and maternal birthplace to SGA delivery. We computed the adjusted odds of SGA birth for deliveries to foreign-born mothers who were categorized by ethnicity relative to their US-born counterparts. The interactions noted above persisted in these models. However, they are not reported because they did not affect the associations of the main independent variables—ethnicity and birthplace—with SGA delivery. In the interest of brevity and interpretability, we only report the main effects model.

Because several maternal characteristics, including age, education, marital status, and parity, dropped out of the model in the stepwise process described above, we reestimated a model including these factors to examine effects on associations of the key ethnicity-birthplace variables on SGA delivery. Since these associations remained unchanged, we report models including only factors that were retained in the stepwise selection.

We assessed overall goodness of fit with the Hosmer-Lemeshow statistic, which at 0.73 was acceptable for the final model. All of these models were estimated using the Tlogistic procedure of the SAS software package.[29]

RESULTS

Overall, 9.6% of the study cohort of HIV-infected women had an SGA delivery. As shown in Table 1, US-born (including Puerto Rican–born) white-Latina and black-Latina mothers had higher proportions of SGA babies than their respective foreign-born counterparts. This difference was less prominent for US-born black women relative to foreign-born black women, while US-born white women had a lower proportion of SGA deliveries than foreign-born white women. Regardless of ethnicity, US-born and Puerto Rican–born women were less educated and less likely to be married than foreign-born mothers. US-born white and black women were also less likely to live in New York City than foreign-born white and black women. We observed higher parity levels and higher HIV severity groups for US-born black- and white-Latinas than their foreign-born counterparts. US-born mothers generally

had higher rates of another chronic comorbidity, such as hypertension or asthma than foreign-born women.

Table 2 shows comparisons of health service utilization and lifestyle behaviors by ethnicity-birthplace group. US-born mothers of all ethnic groups were more likely than foreign-born women to be continuously eligible for Medicaid throughout pregnancy. US-born women were less likely than foreign-born women to have a usual source of care and, except for black women, more likely to receive HIV-focused services, but these associations were significant only for US-born black- and white-Latinas versus their foreign-born counterparts. Among white and white-Latina women, those who were born in the United States had a higher rate of antiretroviral use during pregnancy than those who were foreign born. Generally, adequacy of prenatal care utilization differed by birthplace only for white-Latinas, with US-born women having the poorest level of prenatal care. Finally, smoking, drinking, and illicit drug use during pregnancy were more likely in US-born women than in foreign-born women.

Table 3 displays our final multivariate model of explanatory demographic, clin-

TABLE 3. Adjusted association of small-for-gestational-age delivery with maternal characteristics excluding ethnicity and birthplace

Variable*	Adjusted odds ratio	95% Confidence interval
New York City residence	1.44	0.92, 2.27
Weight gain in pregnancy, pounds		
<19	1.91	1.18, 3.11
19–26	1.08	0.63, 1.83
27–36	1.06	0.61, 1.84
Missing	1.49	0.95, 2.34
HIV severity†		
High	1.10	0.76, 1.60
Medium	1.47	1.06, 2.04
Chronic comorbidity (e.g., asthma)	1.58	1.19, 2.08
HIV-focused services	1.36	1.01, 1.82
Adequacy of Prenatal Care Utilization (APNCU)		
Adequate plus	0.64	0.46, 0.89
Adequate	1.03	0.66, 1.59
Intermediate	0.67	0.36, 1.22
Smoking in pregnancy	1.05	0.74, 1.48
Alcohol in pregnancy	1.35	0.89, 2.04
Illicit drug use/treatment		
Methadone treatment	2.88	1.86, 4.48
Medically supervised, drug-free treatment	1.79	0.92, 3.49
Drug use during pregnancy	2.11	1.46, 3.05
Drug use outside pregnancy	1.70	1.02, 2.82

*Reference groups: white native women, residence outside New York City, weight gain >36 pounds, low HIV severity, no chronic condition, no HIV-focused services, APNCU (Adequacy of Prenatal Care Utilization) inadequate, no alcohol use, and no illicit drug use.

†Low = asymptomatic; medium = anemia and/or pneumonia; high = AIDS-defining diagnosis.

ical, health care, and lifestyle variables. Mothers with little weight gain during pregnancy were more likely to have an SGA delivery; in particular, mothers who gained less than 19 pounds had almost twice the odds of SGA birth than women who gained more than 36 pounds. Women with moderate HIV severity (i.e., diagnosed with anemia or pneumonia during pregnancy) were more likely to deliver SGA babies than those with low severity, while mothers with a chronic non-HIV-specific comorbidity such as hypertension or asthma had over 50% greater adjusted odds of having an SGA delivery than those without these conditions. Receipt of HIV-focused services was associated with a higher risk of SGA birth. Prenatal care categorized as "adequate plus" showed a protective association with SGA delivery compared with mothers receiving inadequate care. The adjusted odds of an SGA delivery were higher for women who used alcohol or illicit drugs, but this association was not significant for alcohol use and medically supervised, drug-free treatment.

Table 4 shows the effect on the odds of SGA birth for foreign-born women in each ethnic group relative to their respective US-born counterparts of progressively adding categories of factors from the model in Table 3. Unadjusted associations are similar to those observed in Table 1. Adjustment for the three categories of explanatory variables attenuated the protective effect of foreign versus US birthplace, with the exception of white women, for whom the difference in the adjusted odds of SGA birth by birthplace grew. After full adjustment in the models for white-Latinas and black-Latinas, SGA delivery was no longer significantly less likely for foreign- versus US-born women, yet the adjusted odds for foreign-born Latinas of both

TABLE 4. Adjusted odds of small-for-gestational-age delivery for foreign-born compared to US-born HIV-infected women within each ethnic group at successive modeling steps

Ethnic-Birthplace Group	Factors added at each modeling step*	Adjusted odds ratio	95% Confidence interval
White foreign born	Unadjusted	1.47	0.53, 4.11
	Demographic/clinical†	1.53	0.54, 4.36
	Health services‡	1.55	0.54, 4.42
	Lifestyle behaviors§	2.05	0.72, 5.87
Black foreign born	Unadjusted	0.72	0.28, 1.83
	Demographic/clinical	0.75	0.29, 1.96
	Health services	0.80	0.31, 2.10
	Lifestyle behaviors	1.13	0.43, 2.98
White-Latina foreign born	Unadjusted	0.29	0.14, 0.61
	Demographic-clinical	0.33	0.15, 0.70
	Health services	0.37	0.17, 0.78
	Lifestyle behaviors	0.50	0.23, 1.09
Black-Latina foreign born	Unadjusted	0.22	0.07, 0.71
	Demographic/clinical	0.29	0.09, 0.99
	Health services	0.42	0.12, 1.42
	Lifestyle behaviors	0.60	0.17, 2.08

*Successive modeling steps include variables from previous steps.

†Demographic/clinical variables were residence in New York City versus rest of state, weight gain during pregnancy, HIV severity, chronic comorbidity.

‡Health services variables were HIV-focused services, Adequacy of Prenatal Care Utilization.

§Lifestyle behaviors were smoking during pregnancy, alcohol use during pregnancy, illicit drug use/treatment categories.

ethnic groups were still nearly 40% to 50% lower. Although the greatest moderation in the effect of Latinas' birthplace on SGA delivery was observed for lifestyle behaviors, including alcohol, tobacco, and illicit drug use. Adjustment for health services factors also moved the adjusted odds of SGA toward 1.

DISCUSSION

In our statewide HIV-infected cohort, at least some of the large difference in SGA babies for foreign-born relative to US-born Latina mothers can be attributed to differences in lifestyle factors, including alcohol use, smoking, and illicit drug use, and to a lesser extent, differences in health services used by these women. This analysis is unique in examining the risk of SGA birth among women with a chronic disease and in exploring outcomes in both white- and black-Latinas, as well as black and white women. Although the difference in SGA delivery by maternal birthplace was no longer statistically significant after full adjustment, white and black foreign-born Latinas still were about half as likely to deliver an SGA infant as US-born Latinas of the same ethnic group. Maternal birthplace was not associated with statistically significant differences in SGA birth for white or black women. Interestingly, the effect of foreign versus US birthplace differed in the last two groups because foreign-born white women had a higher risk of SGA birth, while foreign-born black women had a lower risk than similar US-born women. Therefore, the effect of maternal birthplace on birth outcome was not uniform in different maternal ethnic groups.

A California study of maternal birthplace, ethnicity, and low birth weight reported that foreign-born Latinas had adjusted odds of low birth weight that were approximately 10% lower than for US-born Latinas (95% confidence interval (CI) 0.86, 0.96).[7] Other researchers examined birth outcomes among Latinas with differing countries of origin. Scribner and Dwyer[14] used survey data to develop an index of acculturation and found that Latina mothers with a Mexican cultural orientation had a lower risk of low birth weight deliveries than those with a US orientation. In a reanalysis of these data, Cobas et al.[15] used structural equations to explore the complex relationships among the demographic and behavioral components of acculturation and their direct and indirect effects on low birth weight. They found that language proficiency was the main component of acculturation, which in turn showed a direct association with low birth weight and an indirect one through dietary intake. Guendelman and Abrams[16] used survey data to demonstrate that the dietary advantage of immigrants from Mexico deteriorated among second-generation Mexican-Americans as they became assimilated. Collins and Shay[5] also reported that smoking and alcohol consumption were low among foreign-born Latina women. They theorized that a Mexican-oriented culture might provide mothers with stronger social support mechanisms than contemporary American culture, resulting in more favorable birth outcomes. Becerra et al.[13] suggested that, in addition to reduced smoking and drinking and better nutrition, Mexican-Americans had fewer births outside wedlock and a higher regard for parental roles. Interestingly, Cabral and collegues[17] found a similar pattern among black women, for whom foreign-born mothers had a better prepregnancy nutritional status and prenatal health behaviors, resulting in improved fetal growth. Although Pallotto and colleagues did not investigate reasons for observed differences, they reported that, compared with US-born white mothers, the relative risk of a moderately low birth weight delivery (1,500 to 2,499 g) to US-born black mothers was

significantly higher, while that of Caribbean-born mothers did not differ significantly.[30] These data support an important contribution of cultural, dietary, and lifestyle behaviors in the observed differences in birth outcomes by the ethnicity of US-born women and improved outcomes for foreign-born Latinas.

Our study population included a large number of HIV-infected women born in Puerto Rico who moved to New York. In our study, Puerto Rican–born women had similar rates of SGA delivery as Latinas born in mainland United States, but both groups were more likely to have an SGA infant than foreign-born Latinas. Fuentes-Afflick et al.[8] reported that Puerto Rican women delivering in California had higher adjusted odds of moderately low birth weight deliveries than Latinas born in Central or South American countries. However, Becerra and colleagues[13] reported that Puerto Rican women who resided in the continental United States had higher birth weight infants than those who delivered in Puerto Rico. They hypothesized that Puerto Rican women who moved to the continental United States might be healthier and at lower risk of poor birth outcomes. In this New York State HIV-infected cohort, we were unable to examine the outcomes of Puerto Rican women who still lived on the island in comparison to those residing on the mainland. We were also unable to identify the mainland US-born women who were of Puerto Rican descent to compare this subgroup to those who were born in Puerto Rico.

In our HIV-infected cohort, US-born Latinas demonstrated several characteristics and behaviors that likely placed them at higher risk for poor birth outcomes compared to their foreign-born counterparts, including unmarried status; higher severity of HIV disease; other chronic comorbidities, such as hypertension; alcohol use during pregnancy; smoking during pregnancy; and illicit drug use or treatment during pregnancy. After adjusting for these factors, the adjusted odds of SGA delivery differed less between US-born and foreign-born Latinas, but with adjusted odds substantially less than 1, our data suggest that other unmeasured factors were operative. As noted in other studies, such factors may be related to diet or personal health care.

Although prenatal care categorized as adequate plus showed a favorable association with SGA birth, women receiving HIV-focused care had over 30% higher adjusted odds of SGA delivery. In earlier analyses of this HIV-infected cohort, receipt of HIV-focused services was not associated with low birth weight, but was adversely associated with preterm delivery.[31] Sites providing HIV-focused care may be managing women with more advanced HIV disease. Unfortunately, we were unable to access laboratory markers of disease status such as viral load and CD4 T-lymphocyte count for this population-based cohort. In addition, we relied on maternal self-report for our information on ethnic background, as well as on maternal willingness to admit to alcohol use and smoking during pregnancy. Underreporting of smoking might have contributed to our failure to find an association of this factor with SGA birth.

We also acknowledge that our outcome measure was dependent on information on birth weight and gestational age reported on vital statistics records. Several studies have affirmed the quality of birth weight information on vital statistics records,[32] but we found surprisingly little critical evaluation of gestational age data. Nearly all of the gestational age estimates used in this analysis came from the doctor instead of the mother; information from the former appears to be more accurate than from the latter as it is often based on ultrasound information.[33,34] There is no reason to

suspect differential misclassification of SGA for US-born versus foreign-born women.

Even though our case-finding validation study suggests that we identified most Medicaid-enrolled, HIV-infected women delivering in New York State during our study years, our cohort was still much smaller than the statewide population studies from Illinois and California. Therefore, we were unable to examine birth outcomes related to specific Latino countries of origin. Nonetheless, our study offers an additional dimension to our understanding of the impact of birthplace on birth outcomes among Latinas. In a cohort of pregnant women with HIV infection, we believe that lifestyle factors such as drinking and illicit drug use and, to a lesser extent, difference in utilization of health care, may contribute to better birth outcomes in foreign-born women.

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